

ADDENDUM NO. 1

PART A - BIDDING AND CONTRACT REQUIREMENTS

CITY OF OCEAN SHORES, WASHINGTON

WATER TREATMENT PLANT 2010 IMPROVEMENTS

CITY OF OCEAN SHORES

710 Pt. Brown Ave. NE

P.O. Box 909

Ocean Shores, Washington 98569

December 22, 2009

ADDENDUM NO. 1
CITY OF OCEAN SHORES, WASHINGTON
WATER TREATMENT PLANT 2010 IMPROVEMENTS
DECEMBER 22, 2009

This addendum provides changes to the Contract Documents for the above entitled project to be considered by each bidder. This addendum shall be included in the proposal and, when executing the contract, will be part thereof. Any changes to the Contract Documents made by this addendum shall become a part of the Contract Documents, and all unchanged items shall remain in full force. It is the responsibility of all bidders to conform to this addendum.

Item Number	Specification or Drawing Number	Location and Description of Change
1	Section 00020	Paragraph Sealed Bid Time/Date: MODIFY the bid opening date January 5, 2010 to read "January 7, 2010".
2	Section 00100	Paragraph 00100-1.03: MODIFY the phrase "Addendum will be mailed by regular mail or emailed to each person receiving a set of Contract Documents" to read "Addendum will be mailed by regular mail, or emailed to each person receiving a set of Contract Documents, or posted at the plan centers noted in the Project Manual".
3	Section 01060	Section 01060: After Section 01060, ADD Section 01062 Easements and Permits shown at the end of this addendum.
4	Section 01150	Paragraph 01150-1.02 B-7: MODIFY the phrase "Treated Water (TW)" to read "1W", and MODIFY the phrase "12 inch TW line" to read "12 inch 1W line".
5	Section 01150	Paragraph 01150-1.02 C1: After the phrase "...Retention Tank Building contained in Bid Item 7," ADD the new phrase "including costs for all permits,".
6	Section 01150	Paragraph 01150-1.02 C2: After the phrase "...all as shown and specified," ADD the new phrase "including costs for all permits,".
7	Section 09900	Paragraph 09900 3.01-C 2: After the phrase "...performed in the field", ADD the phrase ", unless otherwise specified".
8	Section 09900	Paragraph 09900 3.01-C 3: After the phrase "...performed in the field", ADD the phrase ", unless otherwise specified".
9	Section 11359	Section 11359: REPLACE this section with Section 11359 Horizontal, Variable Speed, End Suction, Centrifugal Pumps

Item Number	Specification or Drawing Number	Location and Description of Change
		shown at the end of this addendum.
10	Section 11830	Paragraph 11830-1.01 B: DELETE the phrase “control panels and”.
11	Section 11830	Paragraph 11830-1.01 C. RELATED EQUIPMENT: MODIFY this paragraph heading to read “D. RELATED EQUIPMENT:”.
12	Section 11830	Paragraph 11830-1.01 D. PERFORMANCE AND DESIGN REQUIREMENTS: MODIFY this paragraph heading to read “E. PERFORMANCE AND DESIGN REQUIREMENTS:”.
13	Section 11830	Paragraph 11830-1.01 D. RELATED EQUIPMENT: ADD a footnote “b” reference to FCV-4005 and a related footnote that reads “Valve to be supplied by pressure filter manufacturer.”.
14	Section 11830	Paragraph 11830-2.01: MODIFY the phrase “...Roberts Filter, and Siemens” to read “...Roberts Filter, Tonka Equipment Company, and Siemens”.
15	Section 11830	Paragraph 11830-2.03 B: MODIFY the sentence “The distance from the under drain system to the backwash collector shall not be less than 8.5 feet.” to read “The distance from the under drain system to the backwash collector shall be the lesser of 1) 8.5 feet, or 2) the distance required to ensure that the clearance between the top of the fluidized bed during backwashing when the filter media is expanded at 40 percent to the underside of the inlet distributor/backwash collector is at least 18-inches.”.
16	Section 11830	Paragraph 11830-2.03 B: MODIFY the sentence “Weir/trough type distributors shall be constructed of pickled and passivated type 316 stainless steel plate with adjustable weir plates.” to read “Weir/trough type distributors shall be constructed of type 316 stainless steel plate with adjustable weir plates.”.
17	Section 11830	Paragraph 11830-2.03 D: After the sentence ending “...stainless steel screen at the discharge.”, ADD the following sentence “Mal distribution of the air scour flows shall not exceed 5 percent over any part of the air wash distributor.”.
18	Section 11830	Paragraph 11830-2.03 G: After the phrase “filter-to-waste valves” ADD the phrase “, if and as required by the valve manufacturer”.
19	Section 11830	Paragraph 11830-2.04: MODIFY the entire paragraph to read “Fabricated steel or ferrous metal vessel components shall be fully prepared and coated in accordance with the requirements of Section 09900. Interior and exterior surfaces of all pressure vessels shall be completely factory finish painted prior to shipment. All paints, coatings, and sealants to be in contact with

Item Number	Specification or Drawing Number	Location and Description of Change
		water shall be NSF 61 listed. The equipment manufacturer shall provide the Contractor one gallon each of all paint products applied on the pressure vessels for use in paint touch-up after installation. The equipment warranty specified in Part 4 of this Section shall include a warranty on the coating system.”.
20	Section 13530	Paragraph 13530-3.04 B: MODIFY the sentence “Vertical velocities above the underdrain system shall be measured to determine uniformity of water distribution over the total area of the bed.” to read “The height and distribution of vertical hydraulic jets and up-flowing water above the underdrain system shall be inspected to determine uniformity of water distribution over the total area of the bed.”.
21	Section 15050	Paragraph 15050-1.01 C; The Contractor is REMINDED of the provisions in this paragraph associated with CONTRACTOR DESIGN OF PIPING SYSTEMS.
22	Section 15124	Paragraph 15124-1.01 B: REPLACE Equipment Number “MME8300” with “MME8013”.
23	Section 15180	Paragraph 15180-1.03: DELETE valve FCV-4006.
24	Drawing 000-G-002	Drawing Coordinate A-C/4: DELETE the fence designation showing a horizontal line with “Xs” and the associated phrase “FENCE-EXISTING TO REMAIN”. DELETE the fence designation showing a horizontal line with small squares and the associated phrase “FENCE-NEW (WOOD)”. MODIFY the phrase “FENCE-NEW (STEEL)” to read “FENCE-EXISTING TO REMAIN”.
25	Drawing 050-C-004	Drawing Coordinate C-D/5: MODIFY the “hash line” graphic symbol depicting PAVEMENT IN PLAN for the surface treatment shown west of the Retention Tank Building to a graphic symbol depicting “CONCRETE IN PLAN as per the Civil Symbol shown in Drawing 000-G-002.
26	Drawing 050-C-004	Drawing Coordinate F/6: MODIFY the “hash line” graphic symbol depicting PAVEMENT IN PLAN for the surface treatment shown surrounding Well 13 to a graphic symbol depicting “CONCRETE IN PLAN as per the Civil Symbol shown in Drawing 000-G-002.
27	Drawing 050-C-004	Drawing Coordinate E/8: ADD the note “CURB LOCATED ONLY ON NORTH SIDE OF DRIVEWAY” to the rectangular section of concrete driveway shown east of the Disinfection/Permanganate Building.

Item Number	Specification or Drawing Number	Location and Description of Change
28	Drawing 050-C-004	Drawing Coordinate G-H/9: MODIFY the Callout “2” x 8” CEDAR BULKHEAD-STAKE IN PLACE SEE DET E/050-C-007” to read “2” x 8” CEDAR HEADER BOARD-STAKE IN PLACE SEE DET C/050-C-007”.
29	Drawing 050-C-004	Drawing Coordinate G-H/9: MODIFY the Callout “2” x 8” CEDAR BULKHEAD STAKED IN PLACE” to read “2” x 8” CEDAR HEADER BOARD-STAKE IN PLACE SEE DET C/050-C-007”.
30	Drawing 050-C-005	Drawing Coordinate E/9: To the rectangle depicting the location of the concrete slab for the salt saturator tank, ADD the following note: “INSTALL SALT SATURATOR TANK, SATURATED SALT TRANSFER PUMP, AND ALL PIPING, ELECTRICAL, AND INSTRUMENTATION SYSTEMS PER THE MANUFACTURER’S RECOMMENDATIONS. CONNECT TO THE PIPING AND ELECTRICAL/INSTRUMENTATION SYSTEMS SHOWN”.
31	Drawing 050-C-008	Section 1: ADD the following note to this Section: “CONCRETE DRIVEWAY SECTION SHALL BE 6” THICK AND SUPPORTED BY A 6” AGGREGATE BASE”.
32	Drawing 300-P-001	Drawing Coordinate O/4: DELETE the tee and blind flange on the 16”RW pipe.
33	Drawing 300-P-001	Drawing Coordinate O-P/4: DELETE the tee, butterfly valve marked VLV-7003 NO, the drawing cross reference “500-P-003 D b”, and the phrase “To Reservoir” on the 16” RW pipe.
34	Drawing 400-P-001	Drawing Coordinate E/6: MODIFY the pipe designation labeled “12” GWW” to read “12” RW/GWW”.
35	Drawing 400-P-001	Drawing Coordinate F/4: RELOCATE the 12” butterfly valve shown on the bottom of the filter to a location on the horizontal run of 12” GFW/BW pipe between the tee connecting the filter bottom to the pipe labeled as “12” GFW/BW” and the tee connecting to the 4” BA pipe.
36	Drawing 400-P-001	Entire Drawing: MODIFY the graphic symbol for the following valves to reflect the PISTON OPERATED VALVE symbol as shown on Drawing 000-P-002: FCV-4001-A FCV-4001-B FCV-4001-C FCV-4001-D FCV-4001-E

Item Number	Specification or Drawing Number	Location and Description of Change
		FCV-4001-F FCV-4001-H FCV-4001-I
37	Drawing 400-P-002	Drawing Coordinate E/6: MODIFY the pipe designation labeled “12” GWW” to read “12” RW/GWW”.
38	Drawing 400-P-002	Drawing Coordinate F/4: RELOCATE the 12” butterfly valve shown on the bottom of the filter to a location on the horizontal run of 12” GFW/BW pipe between the tee connecting the filter bottom to the pipe labeled as “12” GFW/BW” and the tee connecting to the 4” BA pipe.
39	Drawing 400-P-002	Entire Drawing: MODIFY the graphic symbol for the following valves to reflect the PISTON OPERATED VALVE symbol as shown on Drawing 000-P-002: FCV-4002-A FCV-4002-B FCV-4002-C FCV-4002-D FCV-4002-E FCV-4002-F FCV-4002-H FCV-4002-I
40	Drawing 400-P-003	Drawing Coordinate E/6: MODIFY the pipe designation labeled “12” GWW” to read “12” RW/GWW”.
41	Drawing 400-P-003	Drawing Coordinate F/4: RELOCATE the 12” butterfly valve shown on the bottom of the filter to a location on the horizontal run of 12” GFW/BW pipe between the tee connecting the filter bottom to the pipe labeled as “12” GFW/BW” and the tee connecting to the 4” BA pipe.
42	Drawing 400-P-003	Entire Drawing: MODIFY the graphic symbol for the following valves to reflect the PISTON OPERATED VALVE symbol as shown on Drawing 000-P-002: FCV-4003-A FCV-4003-B FCV-4003-C FCV-4003-D FCV-4003-E FCV-4003-F FCV-4003-H

Item Number	Specification or Drawing Number	Location and Description of Change
		FCV-4003-I
43	Drawing 400-P-004	Drawing Coordinate E/6: MODIFY the pipe designation labeled “12” GWW” to read “12” RW/GWW”.
44	Drawing 400-P-004	Drawing Coordinate F/4: RELOCATE the 12” butterfly valve shown on the bottom of the filter to a location on the horizontal run of 12” GFW/BW pipe between the tee connecting the filter bottom to the pipe labeled as “12” GFW/BW” and the tee connecting to the 4” BA pipe.
45	Drawing 400-P-004	Entire Drawing: MODIFY the graphic symbol for the following valves to reflect the PISTON OPERATED VALVE symbol as shown on Drawing 000-P-002: FCV-4004-A FCV-4004-B FCV-4004-C FCV-4004-D FCV-4004-E FCV-4004-F FCV-4004-H FCV-4004-I
46	Drawing 400-P-005	Drawing Coordinate E-F/7: MODIFY the graphic symbol for the following valves to reflect the PISTON OPERATED VALVE symbol as shown on Drawing 000-P-002: FCV-4005
47	Drawing 400-P-005	Drawing Coordinate D-F/2: DELETE the pipe reducers shown vertically on the four 12” GWW and single 12” FWW pipes.
48	Drawing 400-P-005	Drawing Coordinate C/7: REPLACE the swing check valve on the 12” BW pipe with a Watts Model 757, or Washington State DOH approved equal double check valve assembly with upstream and downstream 12” by 10” reducers.
49	Drawing 500-P-002	Drawing Coordinate K/8: Immediately to the left of the 16” blind flange, ADD a new tee and a 16” by 8” reducer plus terminal blind flange on the branch of the new tee.
50	Drawing 500-P-002	Drawing Coordinate C/8: For the horizontal run of the 8” MTW pipe originating from the drawing cross reference “A 500-P-001 a”, DELETE the vertical pipe segment immediately above the 8” MTW pipe originating from the drawing cross reference “B 500-P-001 b”. MODIFY the horizontal run of the 8” MTW pipe originating from the drawing cross reference “A 500-P-001 a” to continue horizontally to Coordinate J/8, and then drop vertically

Item Number	Specification or Drawing Number	Location and Description of Change
		to tee into 16" by 8" reducer shown vertically at Coordinate J/8.
51	Drawing 500-P-002	Drawing Coordinate C/8: For the horizontal run of the 8" MTW pipe originating from the drawing cross reference "B 500-P-001 b", MODIFY the piping to connect to the 16" by 8" reducer shown vertically at Coordinate C/8, and DELETE the horizontal 8" MTW pipe segment (immediately to the right of this connection to the reducer), extending to the intersection with the pipe reducer shown vertically at Coordinate J/8.
52	Drawing 500-P-003	Drawing Coordinate A-J/4-5: DELETE the piping labeled as "16" RW BYPASS TO RESERVOIR" and the associated drawing cross reference "D 300-P-001 b".
53	Drawing 500-P-003	Drawing Coordinate J/4: RELOCATE the piping designation labeled as "16" FW" shown on the vertical pipe to a location just above the new horizontal pipe above the sample tap.
54	Drawing 600-P-003	Drawing Coordinate D/7: On the 8" BA piping just below the vertically shown double leaf check valve, ADD an 8" by 1" reducer.
55	Drawing 600-P-003	Drawing Coordinate C/3-4: Immediately after each 1" butterfly valve shown, ADD a tee, ball valve, and cap on the branch.
56	Drawing 600-P-003	Drawing Coordinate C/3-4: REPLACE each 1" butterfly valve shown with a 1" ball valve.
57	Drawing 600-P-003	Drawing Coordinate D/3: On the vertical run of 1" SA piping shown, ADD a tee, ball valve and pressure gage on the branch. ADD a Key Note "1" to the pressure gage.
58	Drawing 700-P-001	Drawing Coordinate L/3: DELETE the length of 2" 2W piping shown vertically between drawing cross references "600-P-002 B d" and "850-P-001 B e".
59	Drawing 700-P-001	Drawing Coordinate G-H/3: ADD a 3" by 2" reducer on the horizontal 3" 2W piping between the 3" butterfly valve and the tee supplying water to the ½" 2W piping system.
60	Drawing 700-P-001	Drawing Coordinate G-L/3-4: ADD 3" 2W pipe starting as a tee from the horizontal run of 3" 2W piping located at Coordinate G/3, just downstream of the 3" butterfly valve, to tee into the uppermost section of the 3" 2W pipe shown vertically at Coordinate L/4.
61	Drawing 700-P-001	Drawing Coordinate I/3: REPLACE ½" 2W globe valve with ½" 2W ball valve.
62	Drawing 700-P-001	Drawing Coordinate K-L/5: REPLACE ½" 2W double leaf check valve with ½" 2W globe valve.

Item Number	Specification or Drawing Number	Location and Description of Change
63	Drawing 700-P-001	Drawing Coordinate K-L/4: DELETE ½” 2W globe valve.
64	Drawing 850-P-001	Drawing Coordinate H/3: REPLACE ½” 2W globe valve with ½” 2W ball valve.
65	Drawing 850-P-001	Drawing Coordinate J-K/4: REPLACE ½” 2W double leaf check valve with ½” 2W globe valve.
66	Drawing 850-P-001	Drawing Coordinate J-K/3: DELETE ½” 2W globe valve.
67	Drawing 300-S-005	Drawing Coordinate G/4: MODIFY the dimensional callout “4’-0”” to read “4’-0”, OR AS MODIFIED TO SUIT PUMP”.
68	Drawing 300-S-011	Drawing Coordinate J/7: MODIFY the callout “PUMP CONC PAD” to read “PUMP CONC PAD-DIMENSIONS MODIFIED TO SUIT PUMP”.
69	Drawing 300-S-011	Drawing Coordinate E/9: MODIFY the dimensional callout “4’-0”” to read “4’-0”, OR AS MODIFIED TO SUIT PUMP”.
70	Drawing 300-M-002	Drawing Coordinate M-P/10: DELETE General Note 1.
71	Drawing 400-M-002	Drawing Coordinate A/9: MODIFY piping designation “12 BW” to read “12” 1W”.
72	Drawing 400-M-002	Drawing Coordinate B/8: ADD a rectangle on the 12” 1W pipeline immediately north of the 90 degree elbow graphically representing a new utility vault and new double check valve assembly and ADD the note “Install 10” diameter Watts Model 757, or Washington State DOH approved equal double check valve assembly with reducers in a new utility vault per Detail A/050-C-008.”.
73	Drawing 400-M-004	Drawing Coordinate K-L/7-8: DELETE the check valve shown vertically on the 12” BW line and its respective callout.
74	Drawing 500-M-001	Drawing Coordinate G-L/3-6: Starting with the horizontal run of 16” RW pipe shown on the east side of WTP-2 Building, DELETE the northern-most tee, the 16” RW piping system and butterfly valve shown below that northern-most tee, and the final tee connecting this bypass piping system to the 16” FW pipe conveying FW to the Reservoir.
75	Drawing 500-M-002	Drawing Coordinate J-K/3-9: DELETE the northern-most 16” RW pipe as it runs southward (to the connection point with the 16” FW pipe), and the 16” tee connecting the southern-most section of this bypass pipe where it connects to the 16” FW pipe conveying FW to the Reservoir.

Item Number	Specification or Drawing Number	Location and Description of Change
76	Drawing 500-M-002	Drawing Coordinate K/9: MODIFY the arrow from the 16" RW piping designation to point to the visible 16" RW pipe riser shown at this Drawing Coordinate.
77	Drawing 500-M-002	Drawing Coordinate B/10: MODIFY piping designation "12 BW" to read "12" 1W".
78	Drawing 500-M-002	Drawing Coordinate N/8: MODIFY Key Note 5 "12" BW..." to read "12" 1W...".
79	Drawing 500-M-002	Drawing Coordinate A/2: MODIFY piping designation "12 BW" to read "12" 1W".
80	Drawing 500-M-004	Section 2, Drawing Coordinate N-O/5-6: DELETE the horizontal run of pipe labeled as "16" RW", the connection point to the 16" FW pipe, and the associated 16" RW piping designation.
81	Drawing 500-M-004	Section 4, Drawing Coordinate N/2-3: DELETE the buried lower left pipe shown in section.
82	Drawing 500-M-004	Section 3, Drawing Coordinate A-B/2-3: DELETE the right hand-most pipe shown in section and labeled as "16" RW", and the associated 16 RW" piping designation.
83	Drawing 600-M-002	Drawing Coordinate H-I/2-3: Starting with the horizontal run of 16" RW pipe shown on the east side of WTP-2 Building, DELETE the northern-most tee and the 16" RW piping system and butterfly valve shown below that northern-most tee.
84	Drawing 600-M-003	Drawing Coordinate L-M/3-4: DELETE the northern-most down comer pipe shown, associated flanges, and the piping designation and arrow shown as "16" RW" and associated reference to Key Note 4.
85	Drawing 600-M-004	Section 4, Drawing Coordinate G-I/2-4: DELETE the right hand-most down comer pipe shown, VLV-7003, and the valve designation and associated arrow shown as "VLV-7003 TO RESERVOIR".

LIST OF ATTACHMENTS

Description

1. Section 01062 Easements and Permits
2. Section 11359 Horizontal, Variable Speed, End Suction, Centrifugal Pumps
3. Pre-Bid Meeting Sign-In Sheet

All Bidders shall acknowledge receipt and acceptance of this Addendum with their bid.
Proposals submitted without acknowledgment may be considered informal.

SPECIFICATIONS

1. Section 01062 Easements and Permits
2. Section 11359 Horizontal, Variable Speed, End Suction, Centrifugal Pumps

SECTION 01062

EASEMENTS AND PERMITS

PART 1 GENERAL

1.01 EASEMENTS

No easements are required.

1.02 PERMITS

A. GENERAL:

If, after the bid submittal date, Ocean Shores obtains permits which require changes to the work hereunder and thereby cause an increase or decrease in the Contractor's cost of, or the time required for, the performance of the work under this Contract, the Contractor shall submit information sufficient for the Construction Manager to determine the extent of the effects on the Contractor's cost and/or schedule. If the Construction Manager agrees that the Contractor's cost and/or schedule will be affected by such changes, such effects will be handled in accordance with paragraph 00710-7.02 A. The Construction Manager will provide a copy of such permits to the Contractor. The Contractor shall comply with applicable terms and conditions contained in such permits.

B. PERMITS TO BE OBTAINED BY CONTRACTOR:

The Contractor shall obtain all Building permits, site grading and clearing permits, mechanical permits, electrical permits, and other permits required by the City of Ocean Shores to perform the work. The Contractor shall prepare and submit to the proper authority information required for the issuance of such permits and pay costs thereof, including agency inspections unless specifically provided otherwise in these Contract Documents. The Contractor shall provide a copy of each such permit to the Construction Manager. Information governing the City of Ocean Shores permits can be obtained by contact the City Building Department official, Jim Coon at 360-289-2754. Costs for these permits shall be as determined by the City and the IBC.

C. PERMITS TO BE OBTAINED BY OWNER:

Not used.

1.03 POSTING PERMITS AND EASEMENTS

The Contractor shall clearly post all permits and easements at the site of the work in the Contractor's project trailer accessible to the Construction Manager and Authority Having Jurisdiction (AHJ).

1.04 RESTORATION OF PROPERTY

The Contractor shall comply with property restoration requirements contained in the permits identified in this section.

PART 2 PRODUCTS

NOT USED.

PART 3 EXECUTION

NOT USED.

****END OF SECTION****

SECTION 11359

HORIZONTAL, VARIABLE SPEED, END SUCTION, CENTRIFUGAL PUMPS

PART 1--GENERAL

1.01 DESCRIPTION

A. SCOPE:

This section specifies horizontal, variable speed, end suction, close-coupled, centrifugal pumps for pumping raw and chemically dosed water sourced from groundwater wells and the retention tank. Each pump shall be provided with an electric motor, coupling, and variable frequency drive. Pumps shall be provided in the close-coupled configuration with the pump impeller and electric motor installed on a common shaft.

B. EQUIPMENT LIST:

Item	Equipment No.
WTP-2 Feed Pump 1	PMP-3001
WTP-2 Feed Pump 2	PMP-3002
WTP-2 Feed Pump 3	PMP-3003

The pumps will be installed in a water treatment plant to feed raw and chemically dosed water sourced from groundwater wells and stored in a concrete retention tank and to feed the water to downstream water treatment processes and storage tanks. The speed of the pumps will be regulated to maintain a constant downstream flow rate and/or pressure set point.

C. PERFORMANCE REQUIREMENTS:

The pumps will be installed within the Retention Tank Building adjacent to the retention tank from which they will draw their suction.

The fluid to be pumped is anticipated to range between 40 degrees F and 80 degrees F. The pump shall perform in accordance with the following:

Equipment number	PMP-3001
	PMP-3002
	PMP-3003

Operating Condition

Maximum Speed Operation

Condition A^{1,5}

Capacity, mgd	1.2
Total head, feet	120
NPSHA, feet	23.8

Condition B^{2,5}

Capacity, mgd	1.38
Total head, feet	110
NPSHA, feet	22.8

Reduced Speed Operation

Condition C^{3,5}

Capacity, mgd	0.65
Total head, feet	50
Pump speed	Reduced

Condition D^{4,5}

Capacity, mgd	0
Total head, feet	140
Pump speed	Minimum

NOTES:

1. Condition A shall be taken as the rated, continuous-duty operating condition. Performance at the rated condition shall be guaranteed in accordance with tolerances set forth in the Test Standards of the Hydraulic Institute, except that any increase in head or capacity or both which results in a power requirement greater than the pump motor's nameplate rating will be cause for rejection.
2. Condition B is presented to indicate operating conditions when the pump is operating at maximum speed against minimum anticipated system head, assuming a hypothetical head-capacity curve. Pumps with head-capacity curves steeper than that assumed will produce slightly less flow at slightly lower head. The reverse will occur with pumps having a shallower head-capacity curve.
3. Condition C is the anticipated continuous duty minimum speed condition. Pumps furnished under this specification shall be capable of sustained (24 hours per day) operation at this condition with no damage to bearings, shafts, shaft sleeves or other stationary or rotating parts.
4. Condition D represents the expected momentary (start-up/ shutdown) condition. Pumps furnished under this specification will operate for no more than 30 seconds at this condition when initiating or terminating a service cycle. The maximum anticipated number of service cycles is 50 per day.
5. Total head in the above tabulation is the algebraic difference between the discharge head and suction head as defined in the standards of the Hydraulic Institute. Net positive suction head available (NPSHA) in the above tabulation is referred to project elevation 18.7 ft at the estimated pump suction centerline and is calculated in accordance with Hydraulic Institute standards for the worst anticipated combination of fluid temperature and barometric pressure.

D. DESIGN REQUIREMENTS:

1. GENERAL: The pump and the driver shall be designed to operate at variable speed without cavitation or damaging vibration over the entire specified range of flow and head conditions. The pumping unit shall not be subject to or a source of undue noise, vibration, or undesirable conditions during reductions in flow from the specified operating capacity range to the specified minimum sustained operating condition. The pump head capacity curve shall slope in one continuous curve with no points of reverse slope inflection capable of causing hunting at any pump operational speed.

All components shall be designed to safely withstand forces resulting from flow reversals up to 125 percent of maximum speed within the pump during shutdowns caused by power failure.

The complete pumping unit shall be designed to operate without overload on any component at any point in the pump's entire operating range.

2. CHARACTERISTICS: Equipment provided under this section shall conform to the following:

Pump	PMP-3001 PMP-3002 PMP-3003
Efficiency at Condition A, minimum, percent ¹	70
Piping connection size, inches, minimum	
Inlet	4
Discharge	4
<u>Motor</u>	
Speed, rpm, maximum	1800
Horsepower, maximum ²	40
Type (Reference: Section 11060)	Inverter duty

NOTES:

1. Because the pumps are to operate at variable speed, it is preferred that the pump be selected so that the rated condition lies to the right of the best efficiency point on the pump's head-capacity curve.
2. The motor shall be non-overloading within the selection criteria set forth in Section 11060. Pump selections which do not conform to this requirement without requiring a motor with a nameplate rating greater than that listed are not acceptable.

E. MASS ELASTIC SYSTEMS AND CRITICAL SPEEDS:

Each complete system, including pump, intermediate coupling, motor, and all appurtenances shall have no dangerous critical or resonant frequencies or multiples of resonant frequencies within 20 percent above and 35 percent below the speed range required by the pump to meet the specified operating conditions.

For the purposes of design, a dangerous critical speed shall be defined as one which produces a torsional stress exceeding 3,500 psi. The Contractor shall be responsible for the analysis of critical speeds and the complete mass elastic system, which shall be analyzed and certified by a registered professional engineer regularly engaged in this type of work. Analysis shall be at least equal to the techniques developed by Dunkerly and Holzer. Nothing in this provision shall be construed as relieving the Contractor of his responsibility for this portion of the work.

1.02 QUALITY ASSURANCE

A. REFERENCES:

This section contains references to the following documents. They are a part of this section as specified and modified. Where a referenced document contains references to other standards, those documents are included as references under this section as if referenced directly. In the event of conflict between the requirements of this section and those of the listed documents, the requirements of this section shall prevail.

Unless otherwise specified, references to documents shall mean the documents in effect at the time of Advertisement for Bids or Invitation to Bid (or on the effective date of the Agreement if there were no Bids). If referenced documents have been discontinued by the issuing organization, references to those documents shall mean the replacement documents issued or otherwise identified by that organization or, if there are no replacement documents, the last version of the document before it was discontinued. Where document dates are given in the following listing, references to those documents shall mean the specific document version associated with that date, regardless of whether the document has been superseded by a version with a later date, discontinued or replaced.

Reference	Title
ASTM A48, REV A	Gray Iron Castings
ASTM A276, REV B	Stainless and Heat-Resisting Steel Bars and Shapes
ASTM A582/A582M	Free Machining Stainless and Heat Resisting Steel Bars
ASTM B584	Copper Alloy Sand Castings for General Applications
Hydraulic Institute Standards	Standards of the Hydraulic Institute, 14th Edition

B. UNIT RESPONSIBILITY:

The Contractor shall assign unit responsibility as specified in paragraph 11000-1.02 C to the pump manufacturer for the equipment specified in this section and the variable-frequency drive controllers specified in Section 11069. A Certificate of Unit Responsibility shall be provided.

1.03 SUBMITTALS

The following information shall be provided in accordance with Section 01300:

1. A copy of this specification section, with addendum updates included, and all referenced and applicable sections, with addendum updates included, with each paragraph check-marked to indicate specification compliance or marked to indicate requested deviations from specification requirements. Check marks (✓) shall denote full compliance with a paragraph as a whole. If deviations from the specifications are indicated, and therefore requested by the Contractor, each deviation shall be underlined and denoted by a number in the margin to the right of the identified paragraph, referenced to a detailed written explanation of the reasons for requesting the deviation. The Construction Manager shall be the final authority for determining acceptability of requested deviations. The remaining portions of the paragraph not underlined will signify compliance on the part of the Contractor with the specifications. Failure to include a copy of the marked-up specification sections, along with justification(s) for any requested deviations to the specification requirements, with the submittal shall be sufficient cause for rejection of the entire submittal with no further consideration.
2. A copy of the contract document control diagrams and process and instrumentation diagrams relating to the submitted equipment, with

addendum updates that apply to the equipment in this section, marked to show specific changes necessary for the equipment proposed in the submittal. If no changes are required, the drawing or drawings shall be marked "*no changes required*". Failure to include copies of the relevant drawings with the submittal shall be cause for rejection of the entire submittal with no further review.

3. Certificate of Unit Responsibility attesting that the Contractor has assigned, and that the manufacturer accepts, unit responsibility in accordance with the requirements of this Section and paragraph 11000-1.02 C. No other submittal material will be reviewed until the certificate has been received and found to be in conformance with these requirements.
4. Pump performance curves for the specified operating conditions, showing head, capacity, horsepower, efficiency and net positive suction head required.
5. Motor data form 11060-A as required in Section 11060.
6. Complete list of construction materials.
7. Drawings showing each pump's piping connections, construction details, and dimensions.

PART 2--PRODUCTS

2.01 ACCEPTABLE PRODUCTS

Pumps shall be Peerless Series C, or equal, modified to meet specified requirements.

2.02 MATERIALS

Pump materials shall be as follows:

Component	Material
Casing	Cast iron, ASTM A48, Class 30
Impeller	Cast Bronze, ASTM B584
Wearing Rings	Cast Bronze, ASTM B584
Shaft	Stainless steel: ASTM A276, Type 304 or 316; ASTM A582, Type 303 or 416
Base	Fabricated steel, ASTM A36 or Cast iron, ASTM A48 or ASTM A278, Class 30

Materials specified are considered the minimum acceptable for the purposes of durability, strength, and resistance to erosion and corrosion. The Contractor may propose alternative materials for the purpose of providing greater strength or to meet required stress limitations. However, alternative materials must provide at least the same qualities as those specified for the purpose.

2.03 EQUIPMENT FEATURES

A. GENERAL:

The pump shall be cast iron, bronze fitted, end suction, suitable for the specified service. Operating parts shall be accessible without disturbing piping or motor connections. Casing shall be tested for 175 psi working pressure.

B. COMPONENTS:

1. CASING: Casing shall be cast iron construction, threaded or flanged through bolt pipe connection, vertically split case design, with replaceable bronze case wear rings, and tapped gage openings on suction and discharge nozzles on flanged connection. Venting petcock shall be provided at high point of volute.

2. IMPELLER: Impeller shall be bronze, enclosed, single suction type, static and dynamically balanced, and trimmed to meet specified conditions. Impeller shall be less than 85 percent of largest cutwater diameter accommodated in volute.

3. SHAFT: The shaft shall be of ample strength and stiffness to operate without distortion or damaging vibration throughout the range of service specified. The pump shaft shall be turned, ground and polished, of proportions suitable for use in variable speed pumping applications. The section of shaft fitting between radial and thrust bearings shall be suitably thickened to withstand bending loads at all speeds of operation and at all conditions of flow and head. The shaft shall be of sufficient section to limit deflection at the impeller discharge centerline to not more than 5 mils when the pump is operating at any continuous-duty point defined by the envelope of conditions specified under paragraph 11359-1.01 C. Shaft deflection shall be calculated using the following relationship:

$$Y_{\max} = \frac{R}{3E} \left(\frac{b^3}{I_b} + \frac{a^3 - b^3}{I_a} + \frac{a^2 c}{I_c} \right)$$

where:

Y max = deflection, inches

E = modulus of elasticity, psi
30 x 10⁶ for carbon steel
28 x 10⁶ for 316 stainless steel

a = shaft length, inches, from impeller discharge centerline to the centerline of the radial bearing

b = shaft length, inches, impeller discharge centerline to shaft sleeve shoulder at the radial bearing

c = shaft length between bearings, inches

I_a = moment of inertia of the shaft just outboard of the radial bearing, in⁴

- I_b = moment of inertia of the shaft under the shaft sleeve, in⁴
- I_c = moment of inertia of the shaft section between the radial and thrust bearings, in⁴
- R = radial thrust, pounds, at operating condition

$$R = \frac{K}{K_{SO}} \times \frac{H}{H_{SO}} \times R_{SO}$$

where:

- K_{SO} = Thrust factor at shutoff head at maximum operating speed. K_{SO} shall be as follows:

Specific Speed	K_{SO}
2000	0.34
2200	0.355
2400	0.365
>2400	0.37

- H_{SO} = Total head at shutoff, feet
- H = Total head at operating condition, feet
- R_{SO} = Radial thrust, pounds, at shutoff

$$R_{SO} = K_{SO} \times (H_{SO} \div 2.31) \times D_2 \times B_2$$

where:

D_2 = Impeller diameter, inches

B_2 = Impeller width, inches, at discharge, including shrouds

and

K = Thrust factor at operating condition

$$K = K_{so} [1 - (\frac{Q}{Q_n})^{3.3}]$$

where:

Q = pumped flow at any specified continuous operating condition
(paragraph 11359-1.01 C.)

Q_n = capacity at the pump's best efficiency point

Shaft deflection calculations conforming to the above shall be submitted for the equipment furnished under this section and they shall be certified correct under penalty of perjury by an officer of the manufacturing corporation.

4. BEARING ASSEMBLY: Bearing assembly shall be permanently lubricated and completely removable without disturbing pipe connection or volute case. Assembly shall be either of the following:

- a. Sealed rubber cushioned ball bearings similar to Fafnir super quiet "O" series. Mounted in heavy-duty gray iron frame.
- b. Bronze sleeve type bearings. Oil lubricated with oil level indicator up to a 5 HP pump motor size.

The radial and thrust bearings shall be designed for the worst combination of loading developed at Conditions A, B, or C (paragraph 11359-1.01 C) for a bearing life (L-10) of 50,000 hours in accordance with AFBMA 9 or 11. Calculations supporting the selection of bearing sizes shall be provided as Product Data.

5. COUPLINGS: NOT USED

6. BASE: Base shall be either heavy-duty cast iron construction reinforced against deflection, with integral drip rim, IPS drain connection and grout holes; or formed steel channel type without drip rim as specified in paragraph 11002-2.03.

7. MECHANICAL SEAL: Double mechanical seals suitable for the water temperatures specified in paragraph 11359-1.01 C shall be provided as specified in paragraph 11000-2.04 B. Pumps shall have volute connected flush water where required for seal face cooling and circulation.

8. BACKHEAD:

The backhead or seal chamber cover shall be self-centering and shall permit back pullout.

9. DRIVER ADAPTER

Driver adapters for close coupled pumps shall be of sufficient size, strength, and rigidity to support the driver and prevent excessive vibration. Anchor bolting shall be designed to withstand the unbalanced force developed by the pump at 200 percent of shutoff head at the specified speed and in accordance with Section 05501. In addition, the driver adapter and pump anchors shall be designed for seismic loadings in accordance with the IBC. Each shall be made of fabricated steel and provide for convenient maintenance access to stuffing box and coupling. Materials shall be as specified in paragraph 11359-2.02.

C. MOTOR:

The pump shall be driven by an inverter duty motor as specified in Section 11060. Speed and maximum horsepower shall be as specified in paragraph 11359-1.01 C.

D. VARIABLE FREQUENCY DRIVE:

The variable frequency drive shall conform to the requirements of Section 11069.

2.04 PRODUCT DATA

The following information shall be provided in accordance with Section 01300:

1. Motor data as specified in paragraph 11060-2.05.
2. Calculations of critical speeds and mass elastic system analysis for pumps as specified in paragraph 11359-1.01 E.
3. Guaranteed pump performance curves.
4. Bearing load calculations.
5. Operation and maintenance information specified in Section 01730.
6. Certified shaft deflection calculation to demonstrate compliance with paragraph 11359-2.02 B.3.
7. Installation Certification Form 11000-A as specified in paragraph 11359-3.01.
8. Training Certification Form 11000-B as specified in paragraph 11359-3.02.

PART 3--EXECUTION

3.01 INSTALLATION

Each pumping unit shall be aligned, connected, and installed in accordance with the manufacturer's recommendations. After pump and piping are installed, coupling shall be aligned and adjusted as recommended by the manufacturer. The installation and trial operation shall be certified on Form 11000-A as specified in Section 01999.

3.02 TESTING

Testing of equipment and systems shall be conducted in accordance with the requirements of Section 01660.

3.03 TRAINING

A minimum of 8 hours of training shall be provided by the pump manufacturer's service representative. Training shall conform to Section 01664 and shall be certified on Form 11000-B in Section 01999.

****END OF SECTION****

DRAWINGS

None Added

OTHER

Pre-Bid Meeting Sign-In Sheet

CITY OF OCEAN SHORES

2010 WATER TREATMENT PLANT IMPROVEMENT PROJECT

PRE-BID MEETING
DECEMBER 18 2009

Name (please print)

Company Name

1	Bill Pensich 206-749-2213 bpensich@brownandwell.com	Brown & Caldwell Design Engineers
2	Ray Crisp 360-352-8512 ray@lassen-electric.com	Lassen Electric
3	Mike Blake 425-285-0593 MBlake@MKBConstructors.com	MKB Constructors Fax 425-285-0641
4	Nick Roguliv 581-9015 NICK@ROGULIVS.COM	ROGULIVS INC
5	Brian Thompson 360-532-5220	ROGULIVS INC.
6	RYAN SANDGROTH 253-531-7700 ryan@peaseandsons.com	PEASE & SONS, INC.
7	Chris Hart	Boss Const. 360-398-2300
8	John Gorsolka	McCLURE & SONS
9	Mike McMillan	JAMES W FALKER CO.
10	Spring Hill Const	Jim Lee
11	Ivan Schmidt	Stellar T
12	DAVID SACK	DAVID L SACK CONST.
13	Jim Swanger	William Charles West
14	Gordy McLaren	Prospect Construction
15	DAVE MELNICK	TRIAD MECHANICAL
16	MIKE SATHARD	MATERIALS TESTING & CONSULTING
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